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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/577,801

02/20/2007

Stefan Arndt

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8047

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EXAMINER

GIMIE, MAHMOUD

ART UNIT

PAPER NUMBER

3747

MAIL DATE

DELIVERY MODE

07/31/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,801	<b>Applicant(s)</b> ARNDT ET AL.	
	<b>Examiner</b> Mahmoud Gimie	<b>Art Unit</b> 3747	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 13-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 13, 17, 20 and 22-24 are rejected under 35 U.S.C. 102(b) as being anticipated by W. O. Platt and J. Reid (US 1,341,478)

Platt and Reid disclose a fuel injector (13) comprising: a valve seat; a valve-closure member, which cooperates with a sealing seat of the valve seat; a flow exit region (combustion chamber) for fuel situated downstream from the sealing seat; and projections (11), which influence fuel flow, situated in the flow exit region; wherein the projections are discontinuous in a direction transverse to a flow direction of the fuel (figure 4 shows downwardly bowed ridges or projections marked by breaks or interruptions in height at least at the end of the inclined wall (15) in a direction transverse to the flow direction of the fuel)

Regarding claim 17, wherein the projections (11) have a height, measured perpendicular to a surface of the flow exit region that is smaller than 100 micrometers and greater than roughness peaks of the surface.

Regarding claim 20, wherein the projections have one of a cylindrical, tetrahedral, pyramidal, conical, prism-like, rectangular, semispherical and nub-type shape.

Regarding claim 22, wherein the projections are situated in at least one row set up transversely to the flow; figures 1-4.

Regarding claim 23, wherein the projections are situated at a mutual offset from row to row; figures 3 and 4.

Regarding claim 24, wherein the projections are made by one of roughening, micro-embossing, laser removal, etching, micro-electroplating and deposition of a coating.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 14-16, 18, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over W. O. Platt and J. Reid (US 1,341,478) in view of Yaoita (5,613,471). Platt and Reid disclose all the limitations as applied to claims 13, 17, 20 and 22-24 above, except for the exit region is formed in a first wall and second wall lying opposite the first wall.

Yaoita discloses a fuel injector having an exit region formed in a first wall and second wall lying opposite the first wall.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Platt and Reid by installing the projections on impinging surface having a first wall and a second wall opposite the

second wall as disclosed by Yaoita in order to achieve higher diffusion of the fuel jets; see col. 2 and ll. 10-11 of Yaoita.

Regarding claim 14, wherein the flow exit region is formed by a first wall and a second wall lying opposite the first wall, an exit gap being situated between the first wall and the second wall.

Regarding claim 15, wherein the projections are situated on at least one of the first wall and the second wall of the flow exit region.

Regarding claim 16, wherein, relative to the first wall having a first flow edge, the second wall having a second flow edge ends after the first wall having the first flow edge in a flow direction.

Regarding claim 18, wherein the projections are situated in the exit gap.

Regarding claim 19, wherein the projections are situated downstream from the first flow edge.

Regarding claim 21, wherein a height of the projections (17) *one of* (a) increases (figure 4) and (b) decreases (end of ridges (17) of figure 4) downstream in one of (c) a continuous manner and (d) a stepwise manner.

### ***Response to Arguments***

5. Applicant's arguments filed 6/17/2008 have been fully considered but they are not persuasive.

(i) Applicants argued the Platt and Reid do not disclose discontinuous ridges or projections.

This argument is not persuasive because figure 4 shows downwardly bowed ridges or projections (17) marked by breaks or interruptions in height at least at the end of the inclined wall (15) in a direction transverse to the flow direction of the fuel.

(ii) Applicants argued that Yaoita does not disclose impinging surface having a first wall and a second wall opposite the second wall.

This argument is not persuasive because Yaoita shows multiple impinging surfaces made in the inner wall of the precombustion chamber (1) and the main combustion chamber (2); See figures 1-11.

(iii) Applicants requested evidence of increase or decrease of the height of the projections.

Figure 4 shows increase from the start to near the end and decrease at the end of the ridges; thus showing continuous and discontinuous projections.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mahmoud Gimie whose telephone number is 571-272-4841. The examiner can normally be reached on Monday-Friday between 7 a.m. -3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen K. Cronin can be reached on 571-272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MG/

/Mahmoud Gimie/  
Primary Examiner, Art Unit 3747